

## TRANSMITTAL LETTER TO THE UNITED STATES

DESIGNATED/ELECTED OFFICE (DO/EO/US)

CONCERNING A FILING UNDER 35 U.S.C. 371

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INTERNATIONAL APPLICATION NO.

PCT/US99/02498

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TITLE OF INVENTION

DIGITAL BASEBAND INTERFACE FOR A DVD PLAYER

APPLICANT(S) FOR DO/EO/US

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Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
  - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☒ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ A copy of the International Search Report (PCT/ISA/210).
8. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☒ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

## Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☐ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☒ Certificate of Mailing by Express Mail
20. ☒ Other items or information:

RETURN RECEIPT POSTCARD

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

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INTERNATIONAL APPLICATION NO.

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ATTORNEY

KEY NUMBER

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21. The following fees are submitted:

**BASIC NATIONAL FEE ( 37 CFR 1.492 (a) (1) - (5) ) :**

- ☐ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... \$970.00
- ☒ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... \$840.00
- ☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$690.00
- ☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... \$670.00
- ☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) ..... \$96.00

**ENTER APPROPRIATE BASIC FEE AMOUNT =****\$840.00**Surcharge of **\$130.00** for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492 (e)). ☐ 20 ☐ 30**\$0.00**

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	7 - 20 =	0	x \$18.00
Independent claims	3 - 3 =	0	x \$78.00

**\$0.00****\$0.00**Multiple Dependent Claims (check if applicable). ☐**\$0.00****TOTAL OF ABOVE CALCULATIONS =****\$840.00**Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable). ☐**\$0.00****SUBTOTAL =****\$840.00**Processing fee of **\$130.00** for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492 (f)). ☐ 20 ☐ 30 +**\$0.00****TOTAL NATIONAL FEE =****\$840.00**Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). ☐**\$0.00****TOTAL FEES ENCLOSED =****\$840.00**

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- ☐ A check in the amount of \_\_\_\_\_ to cover the above fees is enclosed.
- ☒ Please charge my Deposit Account No. **07-0832** in the amount of **\$840.00** to cover the above fees.  
A duplicate copy of this sheet is enclosed.
- ☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **07-0832** A duplicate copy of this sheet is enclosed.

**NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.**

SEND ALL CORRESPONDENCE TO:

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DIGITAL BASEBAND INTERFACE FOR A DVD PLAYER

Field of the Invention

- 5 This invention concerns a method for managing the interoperability of digital devices such as a digital video disc player and a digital television interconnected via a digital bus. More particularly, the invention involves a system for processing digital video disc (DVD) subpictures by a digital television.

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Background of the Invention

- Video signal processing systems that utilize storage media having digitally compressed video and audio information recorded thereon include, amongst other devices, a digital video disc player adapted to process information stored in accordance with the digital video disc (DVD) specification. The information on a DVD formatted disc is recorded as discrete packets of data, in accordance with the applicable video and audio data compression standards, wherein designated packets carry data associated with various data streams, such as alternative video angles, audio tracks, subpicture streams and navigation information. A video disc player reading a DVD formatted disc may be controlled to display certain packets of data and skip over others. A single disc may be authored to allow playback of multiple camera angles, story endings, scenes according to a ratings content, etc. DVD subpictures are used as the graphical user interface (GUI) for such features as providing the user the ability to select from one of several different videos on a disc. Using this capability, the DVD system can be used to prevent unauthorized access to information on a particular disc as well as seamlessly provide multiple variations of a video title in accordance with user commands. Current DVD players mix the decoded subpicture information with the decoded video into a single analog video signal for transport to a television.

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A device such as a DVD player may be coupled to other devices, such as a display device, a video/audio recording device, audio equipment and communicate with these other devices via a data bus. Such communication occurs in accordance with a bus protocol. Examples of

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bus protocols include the Consumer Electronics Bus (CEBus) and the IEEE 1394 High Performance Serial Bus. A bus protocol typically provides for communicating both control information and data. For example, CEBus control information is communicated on a "control channel" having a protocol defined in Electronics Industries Association (EIA) specification IS-60. On an IEEE 1394 serial bus, control information is generally passed using the asynchronous services of the serial bus. Control information for a particular application can be defined using a programming language such as for example, Common Application Language (CAL) or AV/C.

### Summary of the Invention

This invention resides, in part, in the inventor's recognition of the below mentioned problems associated with processing the DVD subpictures and navigation control in the digital television. Today, digital video disc (DVD) players process digitally compressed video and audio information stored in accordance with the digital video disc (DVD) specification. This processing includes the conversion of the compressed digital stream to a standard signal (e.g., an NTSC or PAL signal). A remote control device or the front panel of the DVD player is used to produce a "quasi-interactive" program. That is, in response to a user command, a DVD subpicture is generated and combined with the decoded program stream prior to converting the digital stream to an NTSC signal. The DVD subpicture may be thought of as a menu identifying available user initiated options. Navigation through the program is achieved in response to selection of one of these options. Thus navigation information may be thought of as logic that is executed in response to the selection of one of the available options identified in the DVD subpicture.

Video decoding could be performed in a digital apparatus, for example, a digital television (DTV) or digital set-top box, however, it is difficult and expensive to mix the subpicture data with the video in the DVD player prior to transport to the digital apparatus. For simplicity and convenience of comprehension, the remaining discussion of the present invention will encompass the utilization of a digital television although this invention is equally applicable for use with a digital set-top box. At present, DTVs do not support run-

length encoded format that is used for DVD subpictures. The advent of digital television receivers eliminates the burden of converting the digital stream produced in a digital video disc player to an NTSC signal, thereby creating a unique ability to harness the benefit of the digital signal by processing the digital stream within the digital television. However, the additional requirement of decoding DVD subpictures and interpreting DVD navigation information in the digital television would greatly increase the cost and complexity of the digital television. This invention also resides, in part, in providing an apparatus and method for solving the described problems.

The present invention provides for receiving, in a digital television, bit-map digital data representative of a DVD subpicture and combining the bit-map digital data with a decoded content stream received from the DVD disc. Particularly, the present invention provides a digital video signal processing apparatus and method for receiving from a digital video disc player a program content stream representative of a programmed event; decoding the program content stream to generate a signal suitable for display; receiving from the digital video disc player digital data suitable for display associated with the program content stream; and combining the digital data received from the digital video disc player and the program content stream to produce a signal representative of a combined image suitable for display. The program content stream comprises data configured in a compressed format.

Another aspect of the present invention provides for receiving subsequent displayable digital data representative of an updated portion of the previously received digital data; and updating the combined displayable image with the received subsequent displayable data to produce an updated combined displayable image. The step of updating being responsive to user input received by the digital video disc player.

Yet another aspect of the present invention provides for a system for controlling a digital video disc player interconnected by a digital bus to a digital television. Particularly, the digital video disc player processes a program content stream of a digitally compressed format received from a digital video disc received in a digital video disc player to generate an audio/video program stream and a subpicture stream; transmits the audio/video program stream to the digital television via an isochronous

channel of the digital bus; processes the subpicture stream to generate displayable digital data (e.g., bit-map OSD); and transmits the displayable digital data to the digital television via an asynchronous channel of the digital bus.

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### Brief Description of the Drawings

The invention may be better understood by referring to the enclosed drawing in which:

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Figure 1 shows, in simplified block-diagram form, a typical digital video disc player.

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Figure 2 shows, in simplified schematic block-diagram form, a system illustrating the interoperability of the digital video disc player of Figure 1 employing the present invention.

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Figure 3 shows, in simplified schematic block-diagram form, an alternate embodiment of the system shown in Figure 2.

In the drawings, reference numerals that are identical in different figures indicate features that are the same or similar.

### Detailed Description of the Drawings

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The use of IEEE 1394 serial bus has been suggested for many applications within a Home Network environment. It is being discussed within Video Electronics Standards Association (VESA) for use as a "whole home network." It is being built into the next generation PCs and will be used for many local peripherals including disc drives as well as digital audio/video consumer electronic devices such as digital televisions (DTVs) and digital video disc (DVD) players.

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IEEE-1394 is a high speed, low cost digital serial bus developed for use as a peripheral or back-plane bus. Some of the highlights of the bus include: dynamic node address assignments, data rates of 100, 200, and 400 Mbits/sec, asynchronous and isochronous modes, fair bus arbitration, and consistency with ISO/IEC 13213.

Figure 1 is a block diagram showing the basic elements of a typical digital video disc (DVD) player 24. The construction and operation of these elements are known to one of ordinary skill in the art and will not be discussed in detail here. Disc player 24 comprises motor and pickup assembly 26 which, under the control of servo processor 29, spins the disc and reads the information stored thereon. Preamp 27 and DVD data processing unit 28 translate the electrical pulses from motor and pickup assembly 26 into digital data that can be further processed by digital audio/video decoder unit 30. DVD data processing unit 28 typically performs functions such as demodulation, error correction and descrambling of the raw data read from the disc so that the data is in a suitable format for decoder unit 30. Error correction may involve data processing such as that associated with a Reed Solomon algorithm.

Decoder unit 30 receives the demodulated, error corrected and descrambled data, processes the data, and provides the appropriate video and audio signals to a display unit, such as a NTSC television set. Particularly, decoder unit 30 comprises data stream demultiplexer 32 which demultiplexes the data from data processing unit 28 into a plurality of separate data streams, including a video stream, an audio stream and a subpicture stream, and provides the data streams to their respective data decoders. Video decoder 31 receives the video stream and provides a video signal to mixer 33. Subpicture decoder 34 receives the subpicture stream and provides data to on screen display (OSD) control 35 which provides OSD video signals to mixer 33. The combined video signal from mixer 33 is provided to NTSC/PAL encoder 42 which provides a video signal that conforms to the appropriate video signal standard to a video display device, such as an NTSC television. Audio decoder 36 receives the audio streams from data stream demultiplexer 32 and provides the appropriate audio signals to an audio system.

Microcontroller 40 controls the operation of digital video disc player 24. Microcontroller 40 is coupled to user control device 37, which may comprise IR remote control devices, front panel buttons or the like, and translates data from user control device 37 to control the operation of the various elements of disc player 24 described above. Typically, microcontroller 40 is also configured to control various

access features of disc player 24 including, but not limited to, parental lock out, descrambling or decryption information and navigation data. Microcontroller 40 may be embodied in various forms, including, but not limited to, a dedicated integrated circuit, or a part of a  
5 decoder/controller unit.

The combined video signal generated by mixer 33 may be forwarded to the digital television via an IEEE 1394 digital bus. Unfortunately, the through-put of the decoded and uncompressed video signal may  
10 degrade system operation due to the band width requirement of transferring such a video signal via a IEEE 1394 digital bus, for example, 30 frames/second X 720 horizontal pixels X 480 vertical pixels X 24 bits/pixel = 250 Mbits/second. The band width for present IEEE 1394 serial buses is typically limited to 200  
15 Mbits/second. Even with a 400 Mbit/second serial bus, after subtracting the band width necessary for overhead, transferring such decoded and uncompressed video signals would be difficult. For comparison purposes, such a bandwidth correlates to about one-sixth the size of a decoded HDTV signal. As described in further detail  
20 below, the present invention resides in part in recognition of this problem, and in part, in identifying a solution thereto.

Today's digital televisions provide many benefits for digital video processing. Figure 2 defines a system 100 for providing  
25 interoperability between DVD player 24 and digital television (DTV) 50 via an IEEE 1394 serial bus 60. In such a system 100, interoperability may be achieved by transferring the compressed MPEG stream from DVD player 24 to an MPEG decoder integral with DTV 50. Transferring DVD subpictures from DVD player 24 to a DTV  
30 50 can be achieved using one of several formats. For example, a subset of HTML without the navigation features may be used to describe the OSD. Another possibility is to use a run-length-encoding format which is similar to the DVD subpicture format. However, the preferred embodiment involves transferring the actual information in  
35 an OSD bit-map format. For example, an 8 bit/pixel, full screen, 640X480 OSD can be transferred in about 100 msec's utilizing 10% of the bandwidth of the 200 Mbit/sec IEEE 1394 serial bus.



Converting DVD subpictures to an OSD bit-map format and transferring the OSD bit-map subpicture directly from DVD player 24 to DTV 50 via an asynchronous channel of serial bus 60, for example, utilizing a "Pull" method, is described below. DVD player 24 processes the digitally compressed video and audio information stored on the video disc thereby generating a digital stream in an MPEG-PS (program stream) format. In one embodiment of the present invention the MPEG-PS stream is first converted to an MPEG-TS (transport stream) format by PS to TS Converter 39. The MPEG-TS audio/video digital stream is transferred to DTV 50 utilizing an isochronous channel of IEEE 1394 serial bus 60. The OSD bit-map subpicture is not transferred as a composite compressed MPEG video stream but is transferred as a bit-mapped OSD where the OSD may be overlaid in DTV 50 with the decoded MPEG audio/video stream prior to being displayed.

Transferring compressed MPEG-TS data via the digital bus eliminates the throughput and processing problems. The digital television may contain an MPEG Audio/Video Decoder which will be utilized for decoding the MPEG-TS stream. The user will still directly interface with DVD player 24 utilizing the respective user control device 37 (i.e., front panel or remote control). The responses of such user interaction is handled within DVD player 24 by decoding the MPEG sub-pictures and generating a bit-map subpicture OSD. The bit-map OSD may be transferred via an asynchronous channel of IEEE 1394 serial bus 60 to the OSD buffer located in DTV 50. The bit-mapped image is overlaid, within the digital television, with the decoded video MPEG signal. The combined (or overlaid) signal is then displayed.

Figure 3 shows an alternate embodiment of the present invention wherein the MPEG-PS stream is directly decoded by the MPEG decoder in the DTV. MPEG-PS streams require less processing power than MPEG-TS streams; thus broadcast decoders with sufficient packet buffers that utilize software for demultiplexing could be programmed to directly decode MPEG-PS streams. Thus, PS to TS Converter 39 is not required. The audio/video content stream in an MPEG-PS format is transferred over an isochronous channel of IEEE 1394 serial bus 60 to an MPEG decoder in DTV 50.

Utilizing a bit-map format for transfer of DVD subpictures allows (1) the DVD manufacturer to maintain the "look and feel" of the subpicture, (2) for freedom in the generation of the subpicture and (3) for dynamic updates (i.e. partial screen or even single pixel updates are possible). Compared to compressed representations, the bit-map representation requires less processing time to display because displaying such bit-mapped subpictures requires minimal interpretation and manipulation. Descriptive approaches, such as HTML, have a disadvantage of being difficult to specify and upgrade for typical consumer products.

To simplify the transfer of bit-mapped subpictures, a "Pull" method is preferably utilized. With this method, the bulk of the bit-map data is transferred from DVD player 24 to DTV 50 using the asynchronous channel of the IEEE 1394 digital bus. DTV 50 reads the bit-map data from the memory of the peripheral device (i.e., DVD player) by making use of at least one block read transaction of IEEE 1394. The display device is informed of the location and size of the bit-map data via a "trigger" command which is sent from DVD player 24 to DTV 50 when the DVD player 24 is ready to begin transferring data.

Other alternatives for transferring subpictures from DVD player 24 to DTV 50 include; (1) an asynchronous push method which primarily uses IEEE 1394 asynchronous write transactions initiated by DVD player 24 to write the bit-map data into DTV 50, (2) an isochronous transport method for broadcasting the bit-map data over one of the isochronous channels provided by IEEE 1394, (3) an asynchronous stream method for carrying the subpictures and (4) alternately, the bit-map data could be provided via a 8 VSB-T(trellis) or 16 VSB RF remodulated channel.

Once the subpicture is ready for transfer, DVD 24 sends a trigger message to DTV 50. A unique trigger message 22 may be utilized for each subpicture. Initiation of a block transfer usually occurs through the use of a trigger message from DVD 24 to DTV 50. A queue may be implemented in the display device so that trigger messages are processed in the same order in which they are received.

After a trigger message is received from the target, the OSD module in DTV 50 requests memory accesses (i.e., asynchronous reads) starting at the memory location specified in the trigger message. The display device reads all of the information associated with the subpicture and  
5 begins to construct the actual bit-map image. At the same time, it informs DVD 24 that the block has been read so that DVD 24 may free up any memory it had allocated to the transfer of this data block. This subpicture is then displayed. DTV's 50 OSD controller (not shown) uses this data to construct the OSD and mix it with the  
10 decoded MPEG video in DTV 50.

The time required for transfer of bit-map data through the digital bus may be calculated as follows. For example all the data required for a 640x480 OSD with 4 bits/pixel requires 1,228,800 bits. All of this  
15 data can be transferred in about 150 ms assuming a 100 Mb/sec bus, a packet payload of 512 Bytes and assuming that we can transmit one packet each 500µsec. This time decreases even further when one takes into account that no OSD takes up this much space. Using only a quarter (typical) of the entire screen results in roughly 40 ms  
20 transfer time. Small updates can be on the order of a few milliseconds.

#### Application Control Languages

In order for a consumer electronic device to interact with other  
25 devices interconnected via a IEEE 1394 serial bus, a common set of commands must be defined. Three standard approaches for device modeling and control are CAL, AV/C and the approach adopted for the Universal Serial Bus (USB).

30 The design of control languages is based on the assumption that all consumer electronic products have a hierarchical structure of common parts or functions. CAL and AV/C are control languages that distinguish between logical and physical entities. For example, a television (i.e., a physical entity) may have a number of functional  
35 components (i.e., logical entities) such as a tuner, audio amplifier, etc. Such control languages provide two main functions: Resource allocation and Control. Resource allocation is concerned with requesting, using and releasing Generic Network resources. Messages and control are transported by the FCP as defined in IEC-61883 and

discussed above. For example, CAL has adopted an object base methodology for its command syntax. An object contains and has sole access to a set number of internal values known as instance variables (IV). Each object keeps an internal list of methods. A method is an action that an object takes as a result of receiving a message. When a method is invoked, one or more IVs are usually updated. A message may include a method identifier followed by zero or more parameters. When an object receives a method, it looks through its list of methods for one which matches the method identified in the message. If found, the method will be executed. The parameters supplied with the message determine the exact execution of the method.

For a CAL implementation, all devices that are capable of displaying OSDs must implement the following OSD object. This object assumes Asynchronous PULL with trigger message approach. This object would be carried in the trigger message from DVD 24 to DTV 50. Digital television 50 would then pull the menu by reading it from DVD's 24 bus mapped memory space. The response of this request will be used by DVD 24 as an indication that the display device has read these update blocks.

OSD Update Trigger Object

2	OSD Update Trigger Object				(16) Data Memory
The object is used for triggering the OSD mechanism in display capable devices.					
IV	R/W	Type	Name	Context Function	
a (61)	R	Numeric	size_of_block	size of "memory_block" in bytes (default value = 10)	
b (62)	R	Numeric	length_of_record	length of current_record in bytes (default value = 10)	
C (43)	R/W	Numeric	current_index	current record block pointed to (default value = 0)	
l (6C)	R/W	Data ( )	memory_block	In each record, 6 MSBs contain the offset and LSB contains the OSD_type; remaining 3 bytes represent the length of OSD in bytes.	

Although the exemplary embodiment is described with reference to a digital video apparatus adapted to read compressed video and audio data from a disc and to process the data in accordance with the DVD specification, it is to be understood that the present invention may be

used in any video processing apparatus capable of processing digital video and audio information, wherein program related information included with the video and audio information can be used to selectively restrict the playback of certain video and audio information on the disc.

While the invention has been described in detail with respect to numerous embodiments thereof, it will be apparent that upon a reading and understanding of the foregoing, numerous alterations to the described embodiment will occur to those skilled in the art and it is intended to include such alterations within the scope of the appended claims. For example, the invention has been described with respect to DVD players, however this invention is equally applicable to any digital device processing at least one stream of compressed digital data.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2
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ART 34 AMDT

# Claims

1. A method for operating a digital video disc player interconnected by a digital bus to a digital video processing apparatus, the digital video processing apparatus performing the steps of:

(a) receiving from a digital video disc player a program content stream representative of a programmed event, said program content stream including data in a compressed format;

(b) decoding said program content stream in said digital apparatus; characterized by:

(c) receiving from said digital video disc player bit-map data representative of a subpicture associated with said program content stream, said bit-map data being suitable for display; and

(d) combining, in said digital apparatus, said bit-map data received from said digital video disc player and said decoded program content stream to produce a signal representative of a combined image suitable for display.

2. The method of Claim 1 further characterized by the digital apparatus performing the steps of:

(a) receiving subsequent bit-map data representative of an updated portion of said previously received subpicture; and

(b) updating, in response to a user initiated command received by said digital video disc player, said combined image with said received subsequent bit-map data to produce an updated combined image suitable for display.

3. A digital television comprising:

(a) means for receiving from a storage means a compressed digital data stream;

(b) means for decoding said compressed digital data stream in said apparatus; characterized by:

(c) means for receiving from said storage means bit-map data associated with said compressed digital data stream; and

(d) means for combining, in said apparatus, said bit-map data received and said video signal to produce a signal representative of a combined image suitable for display.

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4. The digital television of Claim 3 further characterized by:
  - (a) means for receiving subsequent bit-map data suitable representative of an updated portion of said previously received bit-map data; and
  - (b) means for updating said combined image with said received subsequent bit-map data to produce an updated combined image suitable for display, wherein said updating means is responsive to user input.

5. A method for operating a digital video disc player interconnected by a digital bus to a digital television, the digital video disc player performing the steps of:

- (a) receiving from a digital video disc coupled thereto an MPEG-PS digital stream; characterized by:
- (b) converting said digital stream from an MPEG-PS format to a digital stream having an MPEG-TS format; and
- (c) transmitting said MPEG-TS digital stream to said digital television via an isochronous channel of said digital bus.

6. The method of Claim 5 further characterized by:

- (a) processing a subpicture stream associated with said MPEG-PS digital stream to generate bit-mapped digital data suitable for display; and
- (b) transmitting said bit-mapped digital data to said digital television via an asynchronous channel of said digital bus.

7. The method of Claim 6 further characterized by:

- (a) receiving a user initiated command in response to said displayed bit-mapped digital data;
- (b) generating an updated subpicture stream in response to said user initiated command;
- (c) processing said updated subpicture stream to generate an updated bit-mapped digital data; and
- (d) transmitting said updated bit-mapped digital data.

Managing interoperability of digital devices such as a digital video disc player and a digital television interconnected via a digital bus is provided. This interoperability is based on the IEEE 1394 serial bus for the physical and link layers and makes use of AV/C or CAL as the control language. This invention provides for transferring a DVD subpicture that has been transformed into a bit-mapped on-screen display (OSD) format via an asynchronous channel of the interconnecting serial bus.

Variable	Mean	SD	Min	Max
Age	34.5	10.2	22	55
Gender	1.2	0.4	1	2
Marital status	1.5	0.5	1	3
Education	12.5	1.5	10	16
Income	1.8	0.8	1	3
Health status	1.5	0.5	1	3
Stress level	2.5	1.0	1	4
Life satisfaction	3.5	1.0	1	5
Work satisfaction	3.0	1.0	1	5
Family satisfaction	3.5	1.0	1	5
Community satisfaction	3.0	1.0	1	5
Overall satisfaction	3.2	1.0	1	5



1/3

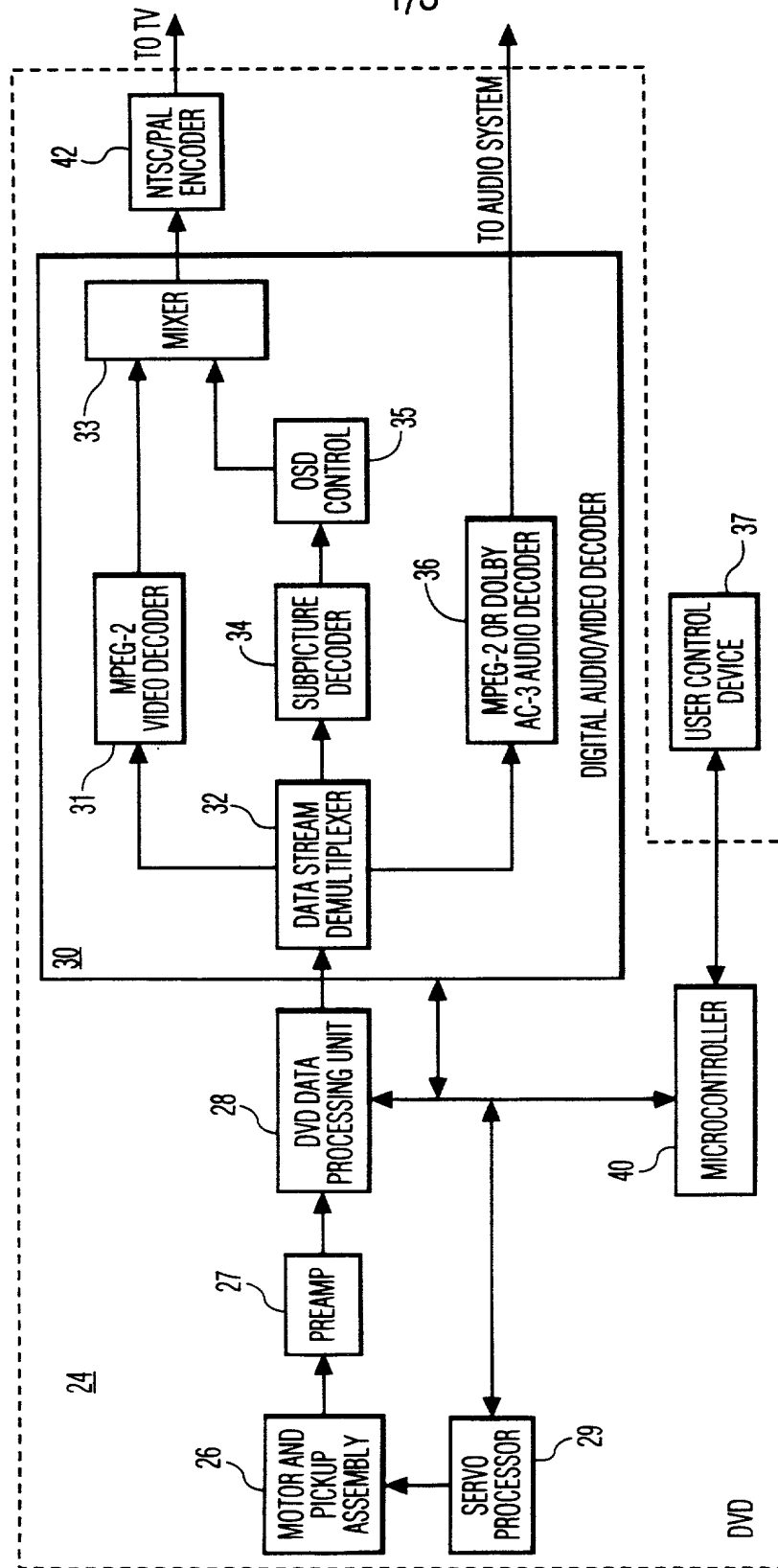
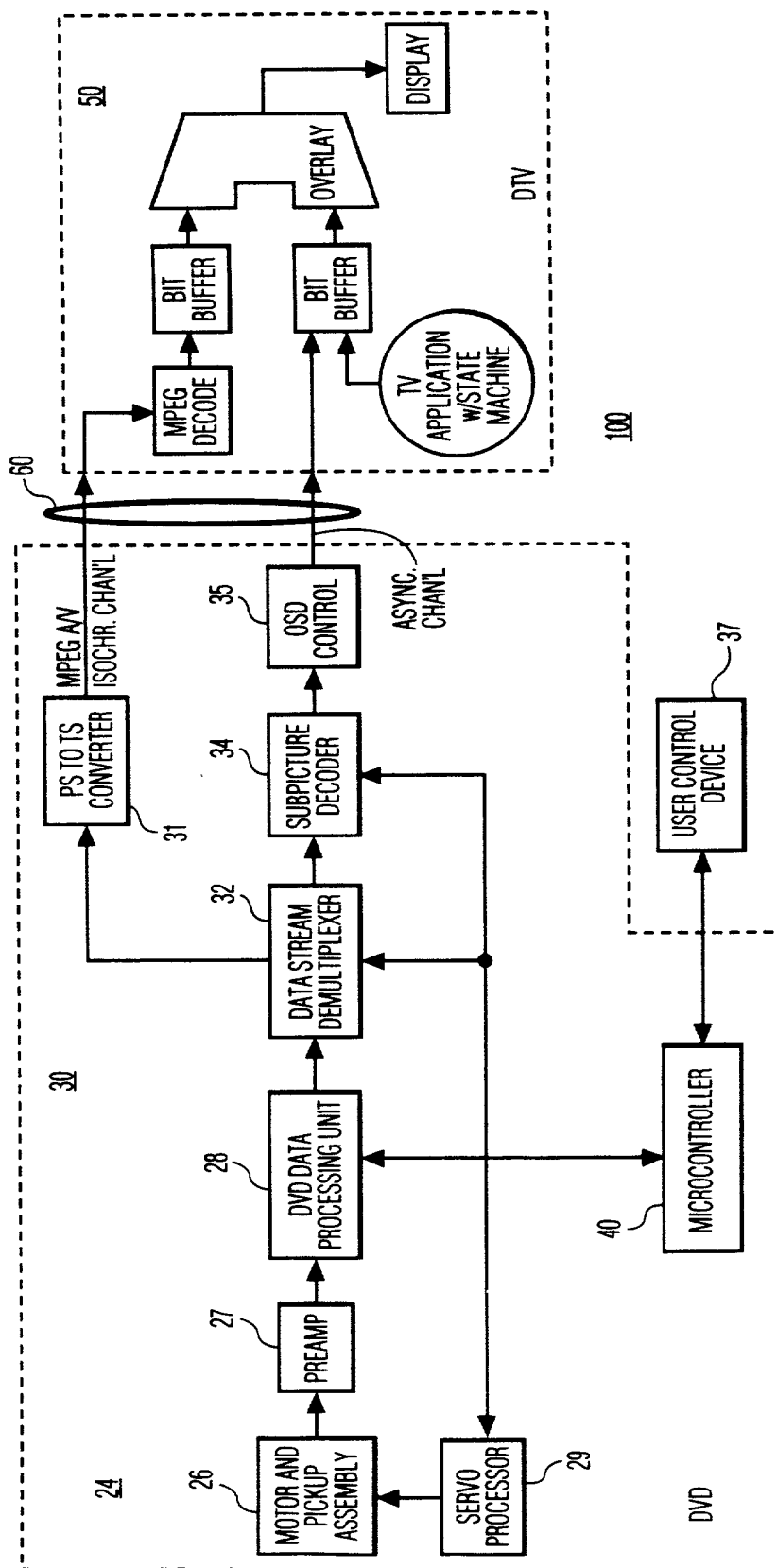
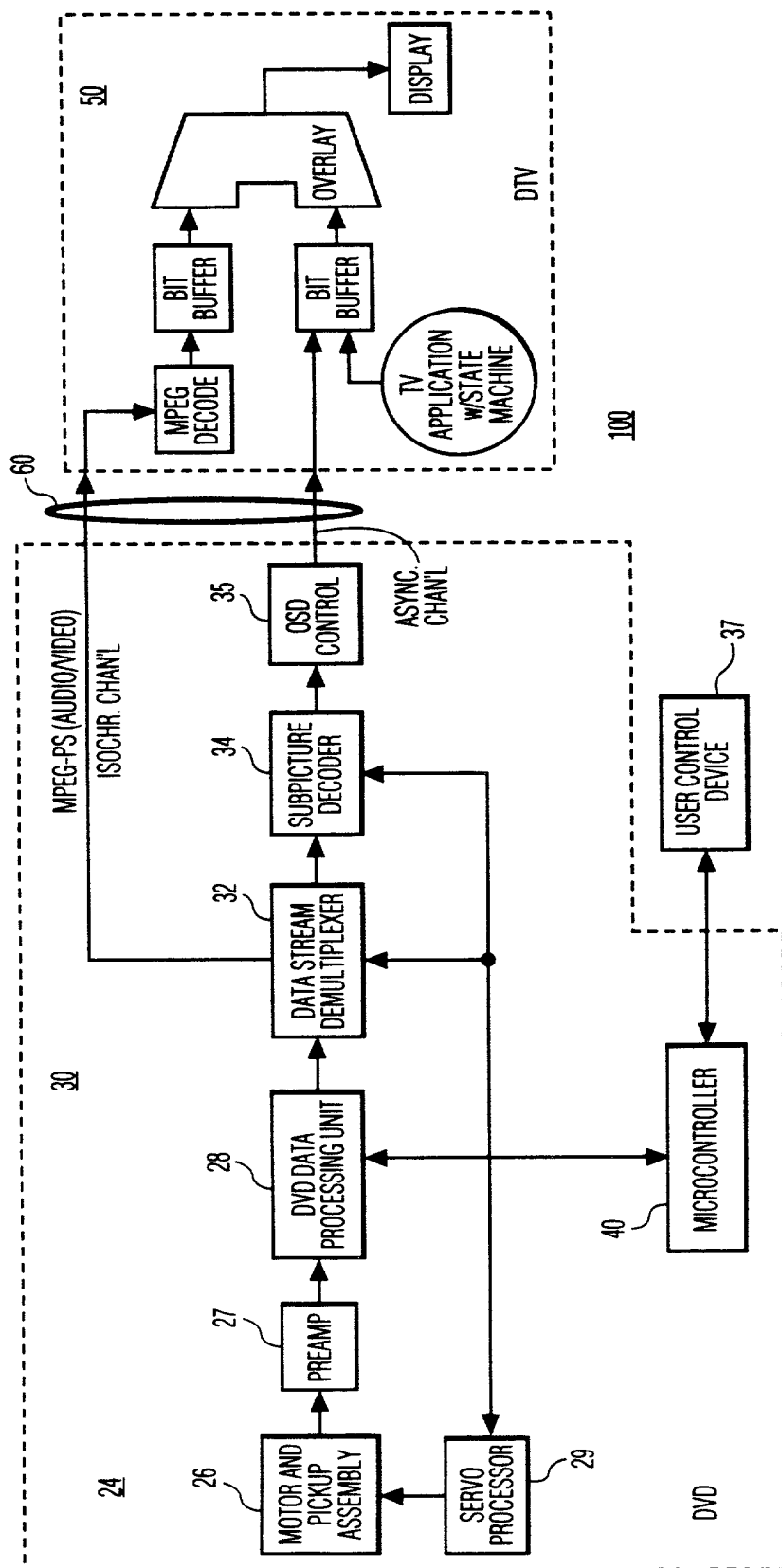


FIG. 1



**FIG. 2**



Please type a plus sign (+) inside this box → ☐

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Approved for use through 9/30/00. OMB 0651-0032  
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

**DECLARATION FOR UTILITY OR  
DESIGN  
PATENT APPLICATION  
(37 CFR 1.63)**

☐ Declaration Submitted with Initial Filing OR ☒ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	RCA 88884
First Named Inventor	Thomas Anthony Stahl
<b>COMPLETE IF KNOWN</b>	
Application Number	
Filing Date	
Group Art Unit	
Examiner Name	

As a below named inventor, I hereby declare

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

DIGITAL BASEBAND INTERFACE FOR A DVD PLAYER

the specification of which (Title of the Invention)

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY)

February 4, 1999

as United States Application Number or PCT International

Application Number PCT/US99/02498 and was amended on (MM/DD/YYYY) February 29, 2000 (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	<input type="checkbox"/> Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.
60/073,696	February 4, 1998	

[Page 1 of 2]

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## DECLARATION — Utility or Design Patent Application

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U. S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)
PCT/US99/02498	February 4, 1999	

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

☐ Customer Number

OR

☒ Registered practitioner(s) name/registration number listed below

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Name	Registration Number	Name	Registration Number
JOSEPH S. TRIPOLI	26,040		
JOSEPH J. LAKS	27,914		
DAVID T. SHONEMAN	39,371		

☐ Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.

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		Fax	609-734-9700

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor:	<input type="checkbox"/> A petition has been filed for this unsigned inventor		
Given Name (first and middle (if any))	Family Name or Surname		
THOMAS ANTHONY	STAHL		
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Post Office Address	Indianapolis, Indiana 46256 US		
City		State	
		ZIP	
		Country	

☐ Additional inventors are being named on the supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto